32692	Patent
Customer Number	Case No.: 58399US002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	M. Benton Free and Mikhail L. Pekurovsky		
Serial No.:	10/607,698	Examiner:	Frederick John Parker
Filed:	June 27, 2003	Tech Center:	1762
For:	PATTERNED COATING METHOD EMPLOYING POLYMERIC COATINGS (as amended)		

Certificate of Express Mailing	
Pursuant to 37 CFR 1.10, I certify that this correspondence is being deposited on the date indicated below with the United States Postal Service "Express Mail Post Office to Addressee" service addressed to: MS: RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.	
Express Mail No.: **ED 697463359 US**	Signature
Date December 21, 2005	Printed Name Lynelle K. Grube

DECLARATION UNDER 37 C.F.R. §131 OF MIKHAIL L. PEKUROVSKY

MS: RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I, Mikhail L. Pekurovsky, hereby declare that:

1. I am the same Mikhail L. Pekurovsky who is named as a coinventor of the above-described application. I received a Diploma in Mechanics from the Department of Mathematics and Mechanics at Moscow State University in 1987. My Diploma degree involved a 5 1/2 year program roughly equivalent to combining a Bachelor of Science and Master of Science degree in the United States. I worked as an Engineer from 1987-89 at the Institute for Aviation Motor Building and from 1989-92 at the Institute for Problems in Mechanics, both in Moscow. From 1992-1999 I pursued but have not yet completed a PhD in Chemical Engineering at the University of Minnesota.

2. I have been employed by 3M since 1999 in the 3M Engineering Systems and Technology Center (now called the 3M Central Research Process Laboratory). Throughout

my 3M assignments I have worked primarily on coating technologies. My present job title is Process Research Specialist.

3. I have read the Final Rejection mailed October 21, 2005 and U.S. Patent Application Publication No. US 2003/0203101 A1 (Haubrich et al.), U.S. Patent No. 5,866,195 (Lemelson) and U.S. Patent No. 5,759,625 (Laubacher et al.).

4. Haubrich et al. say their **FIGS. 3A** through **3D** are a "schematic" view (see Haubrich et al. paragraph **0011**). Haubrich et al. do not say **FIGS. 3A** through **3D** are to scale or that they accurately depict surface contours.

5. Haubrich et al. apply a pattern of ink lines **204** and form an ITO layer **206** over the pattern, as shown in Haubrich et al. **Fig. 3C** which is reproduced below:

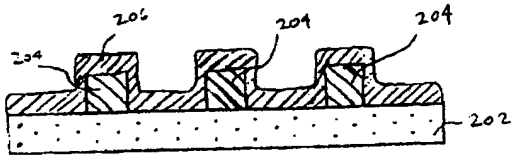


FIG. 3C

The Final Rejection proposes to substitute a layer of conductive polymer from Lemelson for Haubrich et al.'s ITO layer **206**. However, if such a substitution were to be made, the result would not apply a substrate-adherent polymer over a pattern and over at least a portion of a substrate in a continuous layer "having a substantially constant height with respect to the substrate over the pattern and substrate portion" as recited in our claim 1. Layer **206** Haubrich et al. **Fig. 3C** does not have such a substantially constant height. Relying on Lemelson would not change that.

6. Enclosed with this Declaration is a six page Printout I prepared for my attorney's use in an interview with the Examiner on November 17, 2005. The Printout describes two physical samples (labeled as Sample 1 and Sample 2) I also prepared for use in the interview.

7. I made Sample 1 using a printing stamp and a UV-curable multifunctional acrylate polymer to apply closely-spaced parallel fine lines across the narrow dimension of a standard glass microscope slide. I cured the lines by exposing them to a UV lamp. The cured lines had approximately a 1 μm height, 100 μm width and 250 μm line spacing. I next dip-

coated the slide in NANO-SILVER™ conductive ink from Cabot Corporation to form a thin conductive ink layer atop the cured lines. The photomicrograph at the top of Printout page 2 shows a magnified overhead view of Sample 1. The vertical stripes are the lines of cured UV polymer. The blue dot is the tip of an ink mark (a small arrowhead) which I had previously made atop the conductive ink using a marker. The conductive ink layer has gold coloration when examined using the naked eye and light blue-grey coloration in the photomicrograph.

8. The profilometer scan at the bottom of Printout page 2 shows that the conductive ink generally follows the contours of the cured lines in Sample 1, and that the conductive ink is not coated "over the pattern and over at least a portion of the substrate in a continuous layer having a substantially constant height with respect to the substrate over the pattern and substrate portion" as recited in our claims. The profilometer scan also shows that the Sample 1 profile is similar to the profile shown in Haubrich et al. **Fig. 3C** (see the reproduction above and Printout page 1).

9. I next pressed a layer of Scotch Transparent Tape 600 against the conductive ink coating in Sample 1 and peeled away the tape. This removed the conductive ink coating over the cured lines and removed part but not all of the cured lines as well. The photomicrograph at the top of Printout page 3 shows a magnified overhead view of Sample 1 after the tape removal step. The dark blue areas in each stripe represent regions where the conductive ink and cured lines were both removed from the substrate. The lighter blue-grey or silvery areas in each vertical stripe represent regions where some or all of the cured line remained adhered to the substrate. The profilometer scan at the bottom of Printout page 3 shows this in more detail. Scan portions labeled "STRIPPED POLYMER" correspond to regions where the conductive ink and cured lines were both removed from the substrate. A scan portion labeled "COATING NON-UNIFORMITY" corresponds to a region near the pattern edge where the conductive ink coating was not cleanly removed. When an adhesive tape is used to remove a coating from such a profile, non-uniform removal may take place due to difficulties in adhering the tape to step discontinuities (abrupt height differences) in the profile. When other mechanical measures (e.g., impact media) are used to remove such a coating, non-uniform removal may take place due to difficulties in obtaining consistent

coating fracture along the step discontinuities. It is much easier to obtain clean mechanical removal of a coating from a pattern on a substrate if the coating forms "a continuous layer having a substantially constant height with respect to the substrate over the pattern and substrate portion" as recited in our claims (see also **Fig. 2** and **Fig. 4** of our application which are reproduced on Printout page 4).

10. I made Sample 2 by applying streaks of 3M NOVEC™ Electronic Coating EGC-1700 fluoroaliphatic copolymer on a primed polyethylene terephthalate film using a cotton swab, then applied NORLAND™ OPTICAL ADHESIVE 65 UV curable photopolymer (from Norland Products, Inc.) over the resulting release polymer pattern and over at least a portion of the substrate. The photopolymer was cured using UV light. The photomicrograph at the top of Printout page 5 shows a magnified overhead view of Sample 2. The left half of the photomicrograph is a view of the photopolymer atop the PET substrate. The right half of the photomicrograph is a view of photopolymer atop the release polymer pattern atop the PET substrate. The profilometer scan at the bottom of Printout page 5 shows that the photopolymer layer had a substantially constant height with respect to the substrate over the pattern and substrate portion.

11. I next pressed a piece of SCOTCH™ Removable MAGIC™ Tape 811 against the photopolymer in Sample 2 and peeled away the tape. This removed the photopolymer atop the release polymer. The photomicrograph at the top of Printout page 6 shows a magnified overhead view of Sample 2 after the tape removal step. The left half of the photomicrograph is a view of the photopolymer atop the PET substrate. The right half of the photomicrograph is a view of the release polymer atop the PET substrate. The profilometer scan at the bottom of Printout page 6 shows that the adhesive cleanly removed the photopolymer from atop the release polymer pattern, that the release polymer remained on the PET substrate, that the edges of the pattern negative were sharply defined with the major exposed portion of each sidewall being generally perpendicular to the substrate, and that both the release polymer nominal coating thickness and the photopolymer nominal coating thickness were generally unchanged near the boundary between the release polymer and photopolymer. These profilometer results illustrate that it can be easier to carry out clean

mechanical removal of a coating from a pattern on a substrate portion if the coating forms "a continuous layer having a substantially constant height with respect to the substrate over the pattern and substrate portion" as recited in our claims.

12. All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the Application or any patent issuing thereon.

Further Declarant saith not.

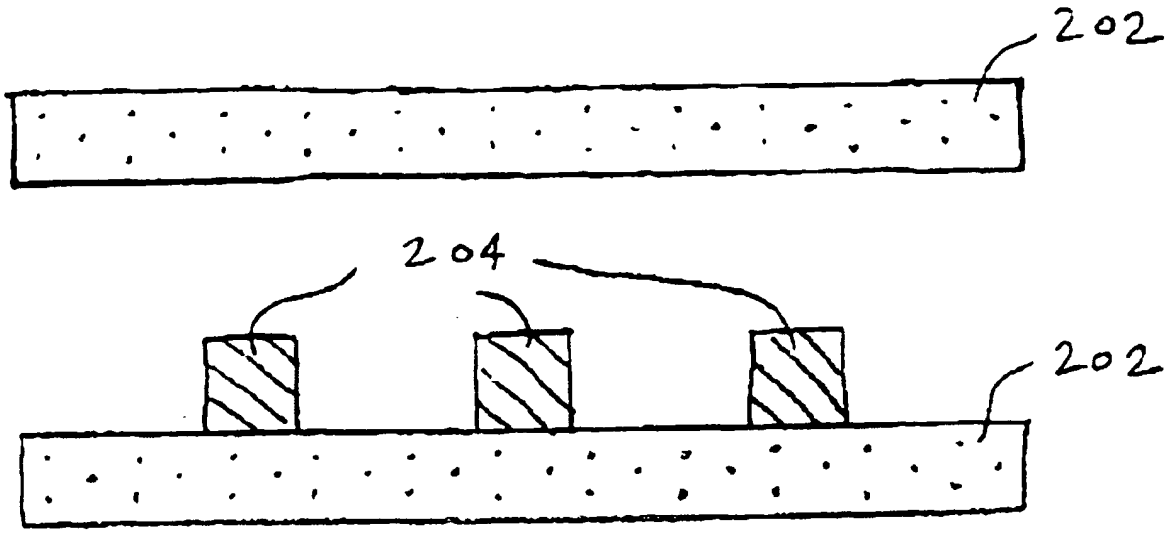
21-Dec-05
Date

Mikhail L. Pekurovsky
Mikhail L. Pekurovsky

Enc: Six page Printout used at November 17, 2005 Interview

SAMPLE 1

REF: **United States**
Patent Application Publication (10) Pub. No.: US 2003/0203101 A1
Haubrich et al. (43) Pub. Date: **Oct. 30, 2003**



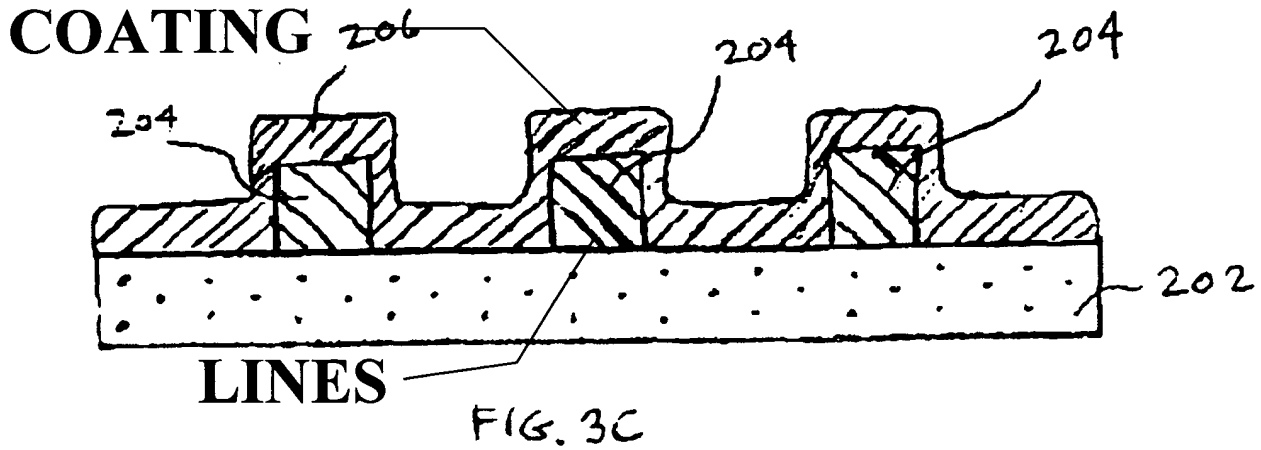


FIG. 3C

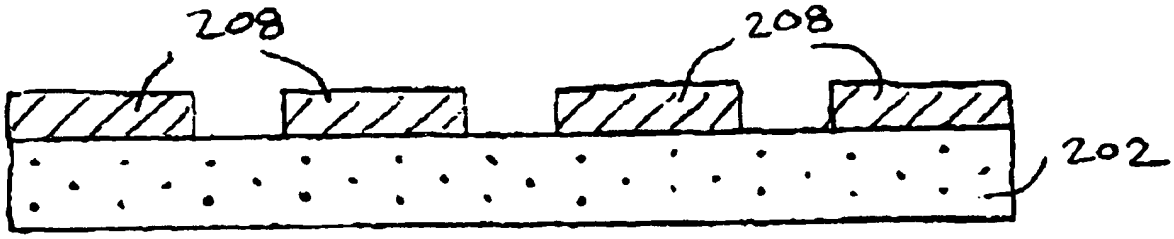
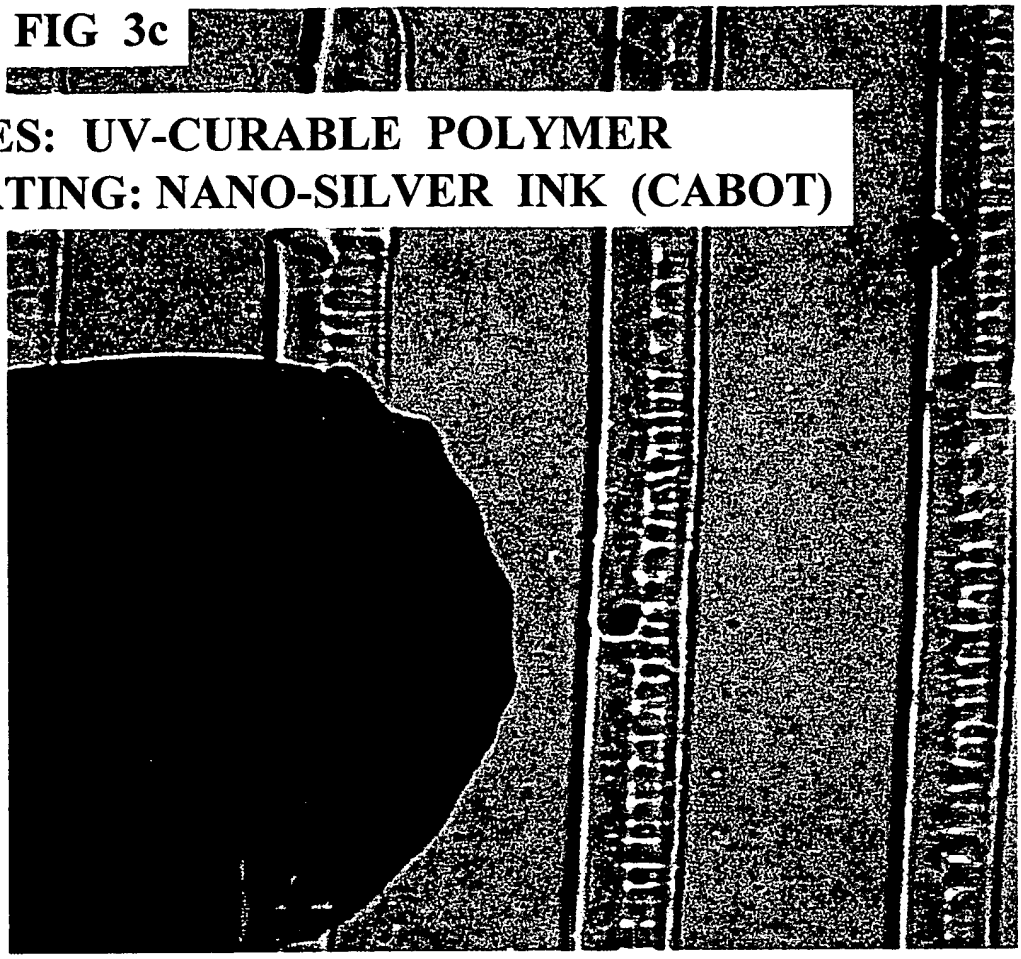
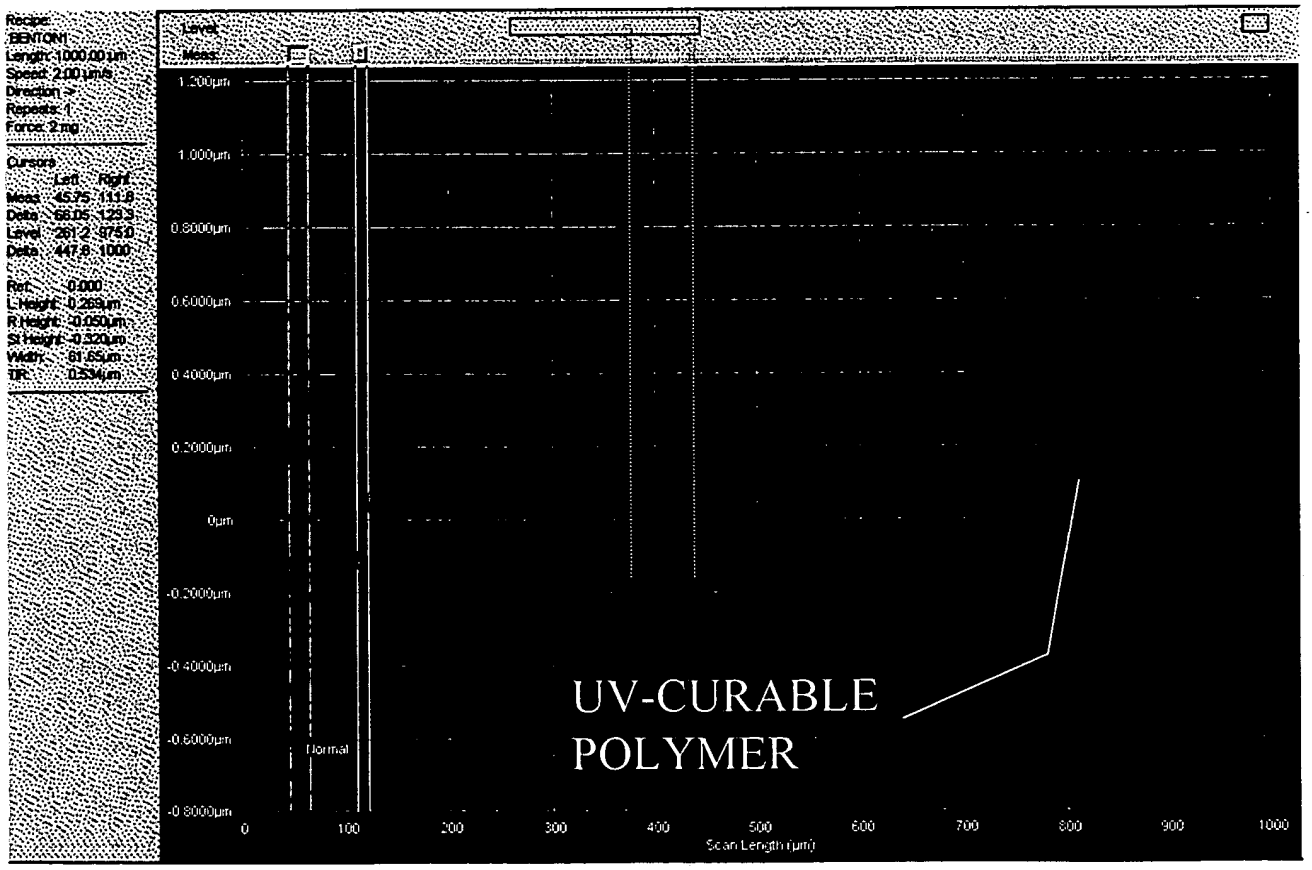


FIG. 3D

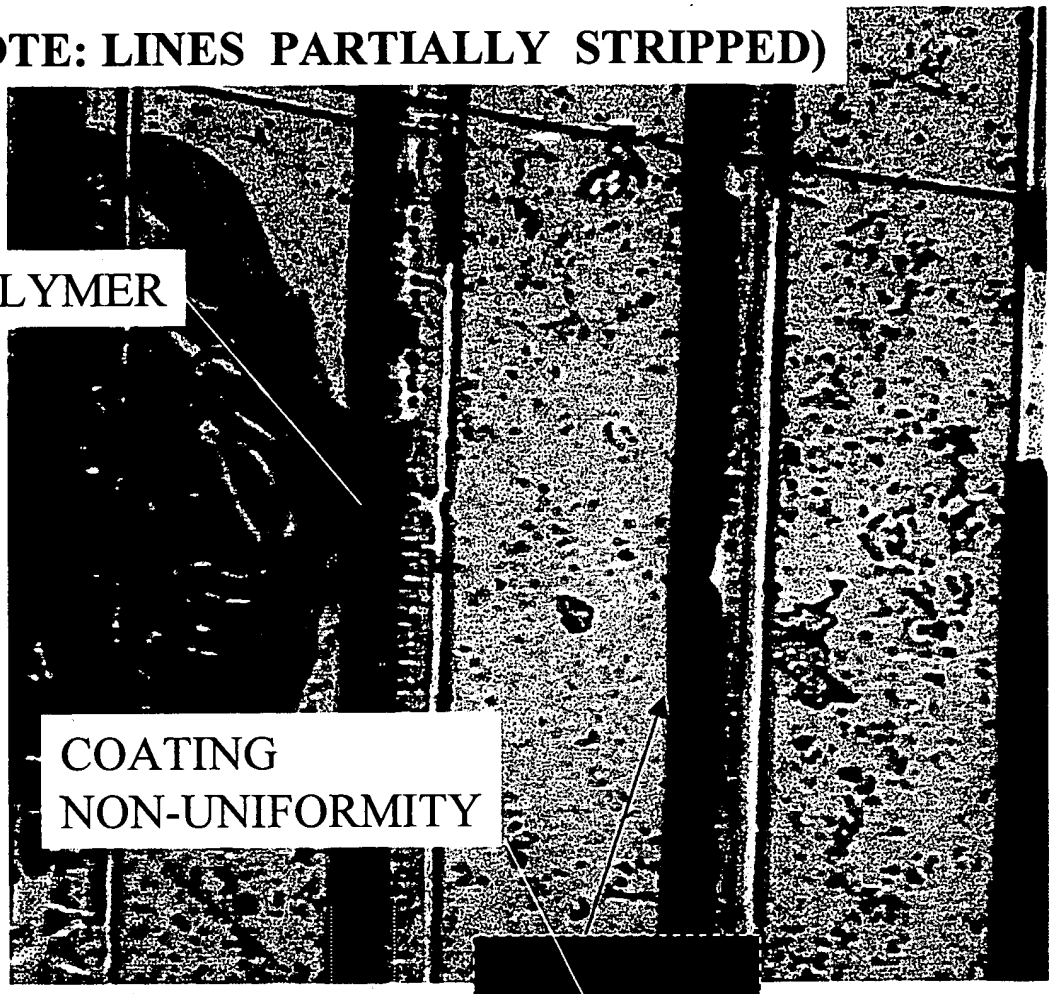
Ref: FIG 3c

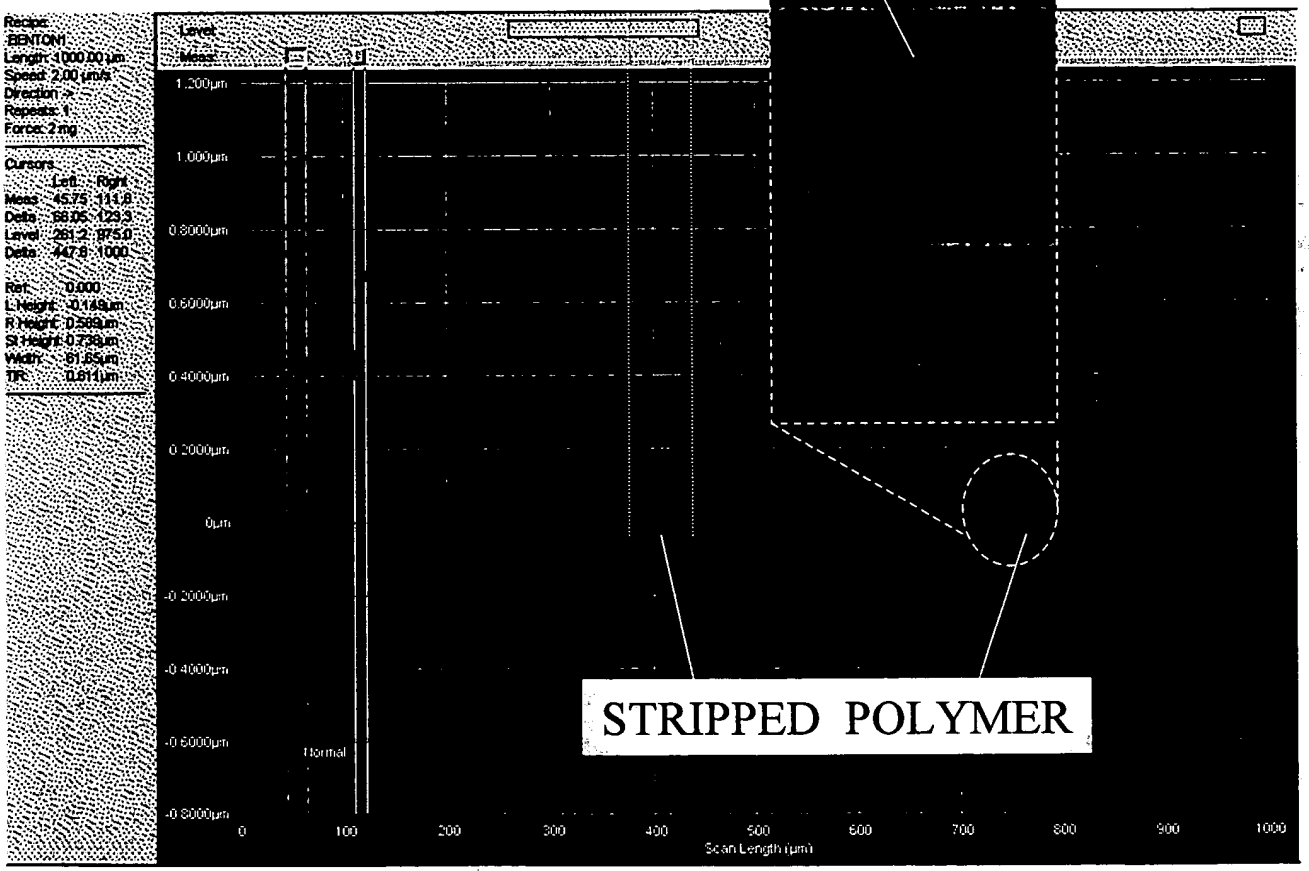
LINES: UV-CURABLE POLYMER
COATING: NANO-SILVER INK (CABOT)





Ref: FIG 3d (NOTE: LINES PARTIALLY STRIPPED)





SAMPLE 2

Patent
Docket No. 58399US002

PATTERNED COATING METHOD

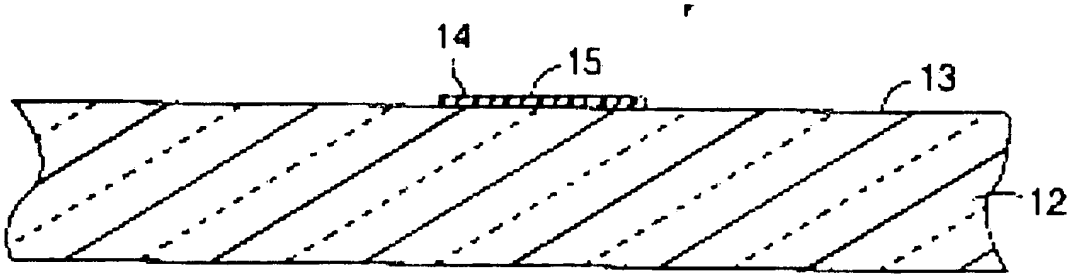


Fig. 1

RELEASE POLYMER

COATING

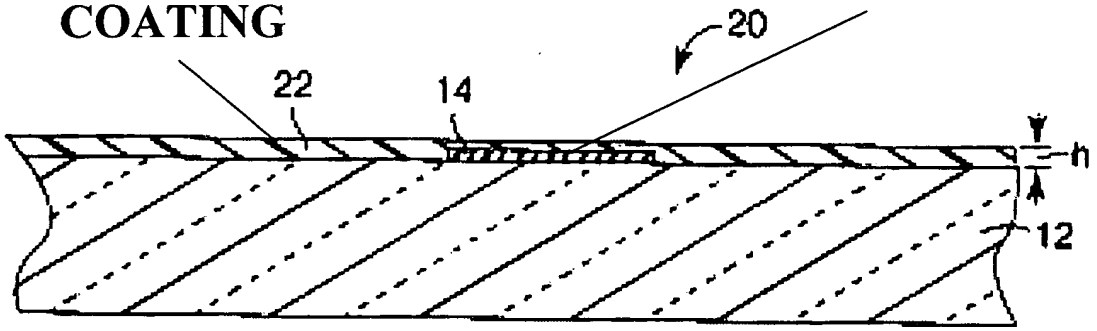


Fig. 2

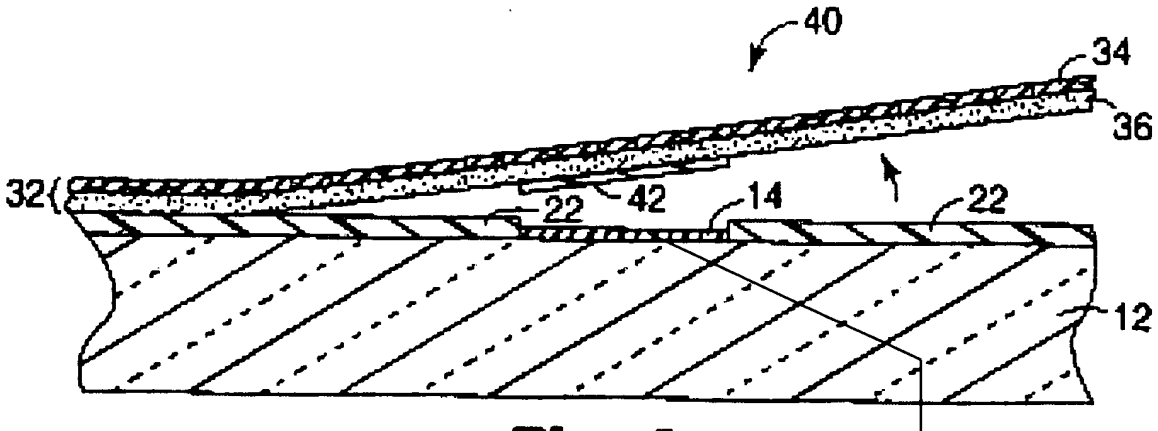
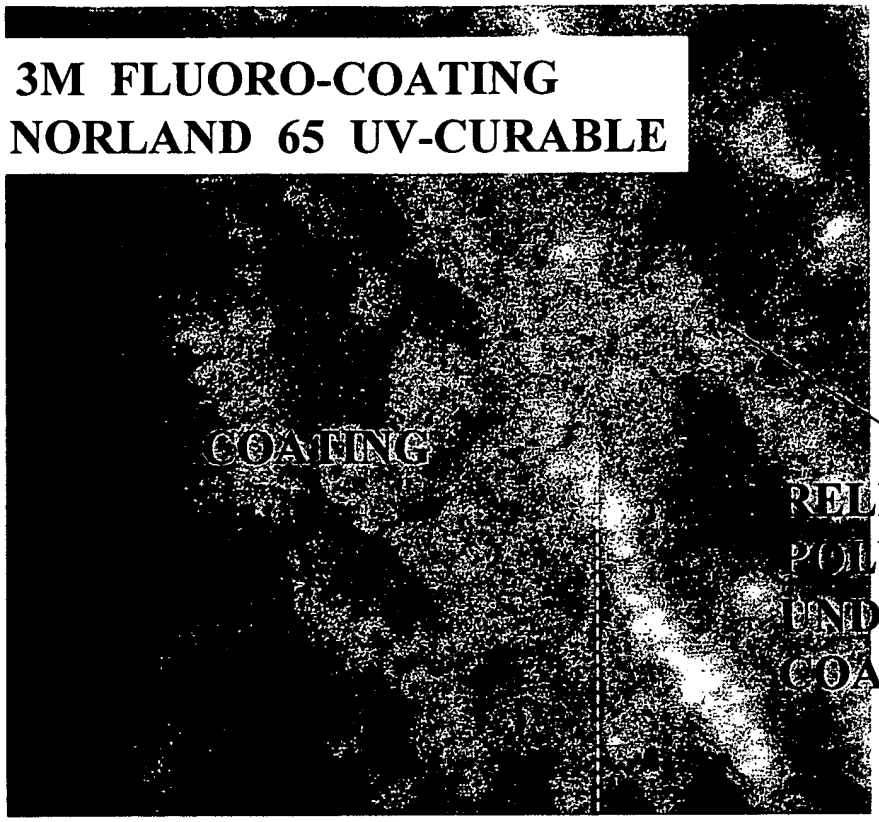


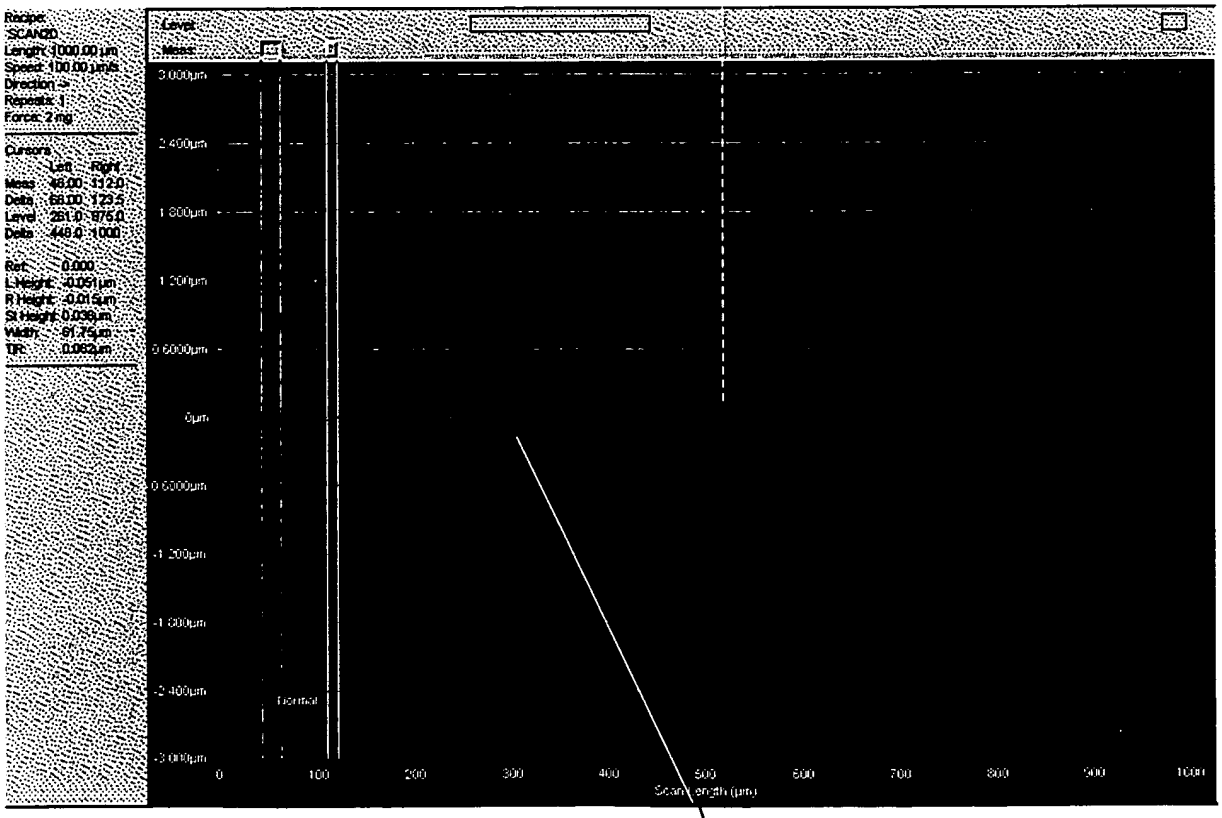
Fig. 4

RELEASE POLYMER

Ref: FIG 2 SCAN 2 ON SAMPLE

RELEASE: 3M FLUORO-COATING
COATING: NORLAND 65 UV-CURABLE





CONSTANT HEIGHT

Ref: FIG 4 (WITHOUT REMOVAL TAPE)

SCAN 1 ON SAMPLE